

CLAIMS

What is claimed:

1. In a system that receives an optical signal having an optical power, a detector that detects the optical signal, the detector comprising:

a substrate;

a detecting layer formed on the substrate, wherein an incident optical signal from a light source is focused on the detecting layer; and

an attenuating layer that is disposed between the detecting layer and the light source such that the incident optical signal passes through the attenuating layer.

2. A detector as defined in claim 1, wherein the attenuating layer is formed on the substrate opposite the detecting layer.

3. A detector as defined in claim 1, wherein the attenuating layer is formed between the substrate and the detecting layer.

4. A detector as defined in claim 1, wherein the detecting layer is one of PIN diode and an APD diode.

5. A detector as defined in claim 1, wherein the attenuating layer is a PIN structure.

6. A detector as defined in claim 5, wherein the PIN structure has a thickness, wherein an attenuation of the incident optical signal is related to the thickness.

7. A detector as defined in claim 5, further comprising a bias input for applying a bias voltage to the PIN structure such that the PIN structure is either forward biased or reverse biased.

8. A detector as defined in claim 7, wherein a level of the bias voltage is dependent on an optical power of the incident optical signal.

9. In a system that receives an optical signal, a detector that attenuates the optical signal based on an optical power of the optical signal, the detector comprising:

a detecting layer that receives an incident optical signal and generates a current that is related to an optical power of the incident optical signal;

a PIN structure connected to the detecting layer such that the incident optical signal passes through the PIN structure before the detecting layer; and

a control module that monitors the optical power of the incident optical signal detected by the detecting layer, wherein the control module generates a bias voltage to reverse bias the PIN structure when the optical power exceeds a threshold such that the incident optical signal is attenuated by the PIN structure before being detected by the detecting layer.

10. A detector as defined in claim 9, wherein the detecting layer is a PIN diode or an APD diode.

11. A detector as defined in claim 9, wherein an I layer of the PIN structure has a thickness, wherein an attenuation of the incident optical signal is related to the thickness of the I layer.

12. A detector as defined in claim 9, wherein the detecting layer is formed on a first side of a substrate and the PIN structure is formed on a second side of the substrate.

13. A detector as defined in claim 9, wherein the PIN structure is formed on a substrate and the detecting layer is formed on the PIN structure.

14. A detector as defined in claim 9, wherein the control module controls the bias voltage such that the PIN structure is forward biased when the optical power is below the threshold.

15. A detector as defined in claim 9, wherein the control module varies a magnitude of the bias voltage according to the optical power such that the optical signal is variably attenuated.

16. A detector as defined in claim 9, further comprising a lens to focus the incident optical signal on the detecting layer.

17. A method for variably attenuating an optical signal, the method comprising:

receiving an optical signal with a detector such that the optical signal is focused on a detecting diode of the detector, wherein the optical signal passes through a PIN structure of the detector before being focused on the detecting diode;

monitoring an optical power of the optical signal;

applying a forward bias to the PIN structure when the optical power is below a threshold; and

applying a reverse bias to the PIN structure when the optical power exceeds the threshold such that the optical signal is partially absorbed.

18. A method as defined in claim 17, wherein reverse biasing the PIN structure when the optical power exceeds the threshold such that the optical signal is partially absorbed further comprises controlling a bias voltage that is applied to the PIN structure.

19. A method as defined in claim 18, wherein controlling the bias voltage that is applied to the PIN structure further comprises:

increasing the bias voltage as the optical power increases past the threshold such that the reverse bias increases to variably attenuate the incident optical signal;

decreasing the bias voltage as the optical power decreases toward the threshold; and

applying a forward bias to the PIN structure when the optical power drops below the threshold.

20. A method as defined in claim 17, wherein applying a reverse bias to the PIN structure when the optical power exceeds the threshold such that the optical signal is partially absorbed further comprises adjusting the reverse bias such that the detector is not saturated by the incident optical signal.

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